Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. - 35. (cancelled)

36. (currently amended) A magnetron treatment chamber comprising:

a magnetron source including

a target with a target surface and an opposite surface, said target being circular about a first center;

a magnet arrangement adjacent said opposite surface and having:

a) at least one first magnet subarrangement, at least a predominant part of said first magnet subarrangement being circular about a second center distant from said first center;

b) at least one second magnet subarrangement, at least a predominant part of said second magnet ~~subsarrangement~~ subarrangement being circular about said second center, outside said first magnet subarrangement and looping around said first center;

c) said first magnet subarrangement having a first area pointing towards said opposite surface and of one magnetic polarity;

d) said second magnet subarrangement having a second area pointing towards said opposite surface and being of the other magnetic polarity;

e) said first area generating a first magnetic flux through said target surface;

f) said second area generating a second magnetic flux through said target surface;

g) said second magnetic flux being larger than said first magnetic flux ;

h) a third magnet subarrangement, said third magnet subarrangement being located in an interspace between ~~circular about said first center and adjacent~~ the periphery of said ~~circular~~ target ~~arrangement~~and, said ~~third~~ second magnet subarrangement, said third magnet subarrangement generating a magnetic flux superimposed upon said second magnetic flux ;

i) a sweeping arrangement ~~moving at least said magnetic flux of said third magnet subarrangement along said target surface~~ rotating said first, second and third magnet subarrangements about said first center; and

(j) a substrate carrier remote from and opposite to the target surface of said magnetron source.

37. - 48. (cancelled)

49. (currently amended) A method of manufacturing substrates with a vacuum plasma treated surface, comprising :

- providing a target circular about a first center and having a target surface;
- providing at least one substrate distinct from and opposite said target surface and having a substrate surface;

- generating in the volume between said target surface and said substrate surface a magnetic field pattern of
  a) a magnetron magnetic field pattern forming a circular closed loop considered in direction towards said target surface and, considered parallel to said target surface, tunnel-like arcing from an outer area loop of a first magnetic pole to an inner area of a second magnetic pole, said magnetron magnetic field pattern being circular about a second center distant from said first center and said magnetron magnetic field parrern looping around said first center;
  b) an asymmetric unbalanced long-range magnetic field pattern by a first magnetic field component generated by an increased magnetic flux along said outer loop area relative to magnetic flux along said inner area and a second magnetic field component generated circularly about said first center and along said outer loop area and a second magnetic field component generated in an interspace between said outer loop area, and the periphery of said target;
- generating a plasma discharge in said magnetic field pattern;
- plasma treating said substrate surface;
- sweeping at least said asymmetric unbalanced long-range magnetic field pattern along said substrate surface.

50. (previously presented) The method of claim 49, said sweeping including rotating said magnetron magnetic field pattern and said asymmetric unbalanced long-range magnetic field pattern about said first center.

51. (previously presented) The method of claim 49, wherein said magnetron magnetic field pattern forms a radius towards said second center.

52. (previously presented) The method of claim 49, further comprising establishing said asymmetric unbalanced long-range magnetic field pattern to result in a magnetic field component at said substrate surface and parallel thereto of at least 0.1 Gauss.

53. (currently amended) The method of claim 52, wherein said component of magnetic field at said substrate surface is ~~elected~~ selected to be between 1 Gauss and 20 Gauss.

54. (cancelled)

55. (previously presented) The method of claim 49, further comprising establishing said magnetron magnetic field pattern to cover at least 60% of said target surface.

56. (previously presented) The method of claim 55, further comprising covering with said magnetron magnetic field pattern at least 85% of said target surface.

57. (previously presented) The method of claim 49, further comprising the step of generating said first magnetic field component, substantially homogeneous along said outer loop area.

58. - 61. (cancelled)

62. (previously presented) The method of claim 49, including generating by said asymmetric unbalanced long-range magnetic field pattern an area of maximum plasma density adjacent a periphery of said substrate surface wherein said sweeping includes sweeping said area of maximum plasma density adjacent and along said periphery.

63. (previously presented) The method of claim 49, wherein said plasma treating said substrate surface includes providing a current of ions at said

substrate surface and adjusting the density distribution of said ions current at said substrate surface by adjusting said second magnetic field component.

64. - 66. (cancelled)

67. (previously presented) The method of claim 49, comprising providing more than one of said substrate.

68. (previously presented) The method of claim 49, further comprising selecting said at least one substrate to be circular or arranged within a circular area and wherein said sweeping includes a movement around a center axis of said circular substrate or circular area.

69. (previously presented) The method of claim 49 further comprising electrically feeding said plasma by a pulsating supply signal.

70. (previously presented) The method of claim 69, further comprising selecting a frequency f of said pulsating to be

$$5\ \text{kHz} \leq f \leq 500\ \text{kHz}.$$

71. (previously presented) The method of claim 70, comprising selecting said frequency f to be

$$100\text{kHz} \leq f \leq 200\ \text{kHz}.$$

72. (previously presented) The method of claim 69, further comprising selecting the duty cycle of said pulsating to have 1 % to 99 % off-times (both values included).

73. (previously presented) The method of claim 72, comprising selecting said duty cycle to have 35% to 50% off-times (both limits included).

74. (previously presented) The method of claim 49, further comprising establishing in said volume a vacuum of a total pressure p to be at most 10^{-1}Pa.

75. (previously presented) The method of claim 74, further comprising selecting said pressure p to be

$$10^{-2} \text{ Pa} \leq p \leq 5 \text{ X } 10^{-2} \text{ Pa.}$$

76. (previously presented) The method of claim 49, further comprising blasing said substrate with an Rf frequency power.

77. (previously presented) The method of claim 76, further comprising adjusting energy of ions in said plasma towards said substrate surface by adjusting said Rf power.

78. (previously presented) The method of claim 49, wherein said target surface comprises a material selected from the group consisting of titanium, tantalum and copper.

79. - 97. (cancelled)

98. (previously presented) The method of claim 49, further comprising generating said magnetron magnetic field pattern along said outer loop area and said first magnetic field component by the same magnet arrangement along said outer loop area.